We claim

1. A substantially purified polypeptide comprising an amino acid sequence of at least 10 contiguous amino acids between X1 and X11 of an amino acid sequence according to formula 1:

B1-[X1-Q-X2-X3-X4-X5-X6-X7-X8-X9-X10-X11]-B2;

wherein X1 is selected from the group consisting of V, E, and A, or is absent;

X2 is selected from the group consisting of A, N, and G;

X3 is any amino acid;

X4 is selected from the group consisting of P and Q;

X5 is selected from the group consisting of S, R, and C;

X6 is selected from the group consisting of N, L, G, and K;

X7 is selected from the group consisting of Q, A, S, and H;

X8 is selected from the group consisting of H, L, and A;

X9 is selected from the group consisting of S and T;

X10 is selected from the group consisting of P and A;

X11 is selected from the group consisting of R, G, and P; and

wherein B1 and B2 are independently 1-5 amino acids, or are absent.

2. The substantially purified polypeptide of claim 1, wherein

X1 is V or is absent;

X2 is selected from the group consisting of A and N

X5 is selected from the group consisting of S and R;

X6 is N;

X7 is selected from the group consisting of Q and A;

X8 is selected from the group consisting of H and L; and

X11 is selected from the group consisting of R and G.

3. The substantially purified polypeptide of claim 1, wherein

X1 is V or is absent;

X2 is A;

X3 is any amino acid;

X4 is Q;

X5 is S;

X6 is N;

X7 is Q;

X8 is H;

X9 is T;

X10 is P; and

X11 is R.

4. The substantially purified polypeptide of claim 3 wherein X3 is T.

5. A substantially purified polypeptide comprising at least 8 contiguous amino acids between X1 and X6 of an amino acid sequence according to formula 2:

B1-[X1-X2-X3-X4-I-N-I-X5-N-R-G-X6]-B2;

wherein X1 is selected from the group consisting of C, L, and Q, or is absent;

X2 is selected from the group consisting of R, P, and S or is absent;

X3 is selected from the group consisting of A, S, and T, or is absent;

X4 is selected from the group consisting of S and T, or is absent;

X5 is selected from the group consisting of S and T; and

X6 is selected from the group consisting of S and T; and

wherein B1 and B2 are independently 1-5 amino acids, or are absent.

6. The substantially purified polypeptide of claim 5 wherein

X1 is L or is absent;

X2 is P or is absent;

X3 is T or is absent;

X4 and X5 are T; and

X6 is S.

7. A substantially purified polypeptide comprising an amino acid sequence of at least 10 contiguous amino acids between X1 and X3 of an amino acid sequence according to formula 3:

B1-[X1-T-D-E-X2-R-R-Q-X3]-B2;

wherein X1 is selected from the group consisting of C and T, or is absent;

X2 is a 4 amino acid group;

X3 is selected from the group consisting of C and P, or is absent; and

wherein B1 and B2 are independently 1-5 amino acids, or are absent.

8. The substantially purified polypeptide of claim 7, wherein

X2 consists of an amino acid sequence according to general formula 4:

Z1-Z2-Z3-Z4

wherein Z1 is selected from the group consisting of A and p;

Z2 is selected from the group consisting of L and F;

Z3 is selected from the group consisting of Y and V; and

Z4 is selected from the group consisting of T and Y.

9. A substantially purified polypeptide comprising a polypeptide that competes with free GalNAc for binding to a GalNAc-specific lectin.

10. The substantially purified polypeptide of claim 9, wherein the substantially purified polypeptide comprises an amino acid sequence selected from the group consisting of **SEQ ID NOS:1-23, 29, 31-33,** and **36-45**.

11. A substantially purified polypeptide comprising a polypeptide that competes with one or more of the polypeptides according to **SEQ ID NOS:1-23, 29, 31-33,** and **36-45** for binding to a GalNAc-specific lectin.

12. The substantially purified polypeptide of any one of claims 1-11, wherein the substantially purified polypeptide is present in multiple copies.

13. The substantially purified polypeptide of claim 12 wherein the substantially purified polypeptide is branched.

14. A pharmaceutical composition comprising the substantially purified polypeptide

of any one of claims 1-11 and a pharmaceutically acceptable carrier.

15. A substantially purified nucleic acid composition comprising a nucleic acid sequence that encodes a polypeptide according to any one of claims 1-11.

16. A recombinant expression vector comprising the substantially purified nucleic acid sequence of claim 15.

17. A recombinant host cell transfected with the recombinant expression vector of claim 16.

18. A method for stimulating immune system activity in a subject, comprising administering to a subject an amount effective of a polypeptide according to any one of claim 1-11 and 13 for stimulating immune system activity.

19. The method of claim 18 wherein the subject is suffering from an infection.

20. The method of claim 18 wherein the subject has a tumor.

21. The method of claim 18 wherein the subject has a bone disorder.

22. The method of claim 18 wherein the subject is in need of anti-angiogenic therapy.

23. The method of claim 18 wherein the subject is suffering from an immune suppressed disorder.

24. The method of claim 18 wherein the subject is suffering from pain.

25. The method of claim 18 wherein the subject is also receiving a vaccination.

26. A method for treating an infection in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for treating the infection.

27. A method for treating a tumor in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for treating the tumor.

28. A method for treating a bone disorder in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for treating the bone disorder.

29. A method for anti-angiogenic therapy in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for inhibiting angiogenesis.

30. A method for treating an immune suppressed disorder in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for treating the an immune suppressed disorder.

31. A method for treating pain in a subject, comprising administering to the subject an amount effective of a polypeptide according to any one of claims 1-11 and 13 for treating the pain.

32. An improved method of vaccination in a subject, comprising administering to a subject receiving a vaccination an amount effective of a polypeptide according to any one of claims 1-11 and 13 for promoting an improved immune system response to the vaccination.

33. A method for identifying a GalNAc-polypeptide mimetics, comprising:

a) contacting a plurality of test polypeptides with a GalNAc-specific lectin under conditions to promote binding of the GalNAc-specific lectin with a GalNAc polypeptide mimetic;

b) removing unbound test polypeptides;

c) repeating steps (a) and (b) a desired number of times;

d) contacting test polypeptides bound to the GalNAc-specific lectin with an amount effective of free GalNAc to displace the bound test polypeptides if the bound test polypeptides are acting as GalNAc-mimetics; and

e) identifying those test polypeptides that are displaced from the GalNAc-specific lectin by free GalNAc, wherein such test polypeptides are GalNAc-polypeptide mimetics.

34. The method of claim 33 further comprising synthesizing the GalNAc-polypeptide mimetics.

35. A method for identifying a GalNAc mimetic compound, comprising:

a) contacting a plurality of test compounds with a GalNAc-specific lectin under conditions to promote binding of the GalNAc-specific lectin with a GalNAc mimetic compound;

b) removing unbound test compounds;

c) repeating steps (a) and (b) a desired number of times;

d) contacting test compounds bound to the GalNAc-specific lectin with an amount effective of a polypeptide comprising or consisting of an amino acid sequence according to **SEQ ID NOS:1-23, 29, 31-33,** and **36-45** to displace the bound test compounds if the bound test compounds are acting as GalNAc-mimetics; and

e) identifying those test compounds that are displaced from the GalNAc-specific lectin by a polypeptide comprising or consisting of an amino acid sequence according to **SEQ ID NOS:1-23, 29, 31-33,** and **36-45**, wherein such test compounds are GalNAc mimetic compounds.

36. The method of claim 35 wherein the test compounds comprise polypeptides.

37. The method of claim 35 further comprising synthesizing the GalNAc mimetic compounds.